

Managed Access To Information Over Data Networks

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FIELD OF THE INVENTION

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This invention relates to the managed access to information over data networks such as the Internet or corporate local area or wide area networks. The invention is of particular interest in the field of learning management systems in which users are provided with access to educational content. However, the invention is also relevant to managing access of users to other types of information such as technical databases, financial data and so forth.

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BACKGROUND TO THE INVENTION

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Education has been a key process in the maintenance and development of every civilized society. In the 20 century, the development of methods and technology for remote education has become increasingly important. Distance learning using communication by mail has become a popular method of education which is of particular interest to those who are employed and do not have time for a full time education at a college. Broadcasting of educational material by radio or television at a predetermined time is another way in which educational material method. Another remote education method uses video media. It is also known to have a video conferencing system, in which a teacher

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and a student view each other via a video link. In one system, educational material is distributed through a general network. In this network a dedicated videophone system and a whiteboard system, which can share data via computers, are linked via a local area network (LAN) or a wide area network (WAN).

The above-described conventional remote education methods generally cause users to be restricted by time and / or location. It can be difficult to increase the number of users and prepare a variety of flexible educational contents.

With the increasing use of the Internet, remote learning systems have been developed which enable people to access educational courses from anywhere in the world, at any time, by using e.g. a browser such as Microsoft Internet Explorer (Trade Mark). An educational establishment hosts a site with one or more educational courses, and users who are registered may log on to the site and access the appropriate course. This type of system is often referred to as "e-Learning". In the last few years, computer systems that enable the delivery, management, and administration of enterprise-wide learning, known as Learning Management Systems (LMS) have become increasingly popular. Learning Management Systems are suites of tools that deliver the proper course or content to the students, at the proper time, in the proper format. An LMS typically provides registration capabilities for all types of learning events, student home pages, automated course catalogues, classroom resource management, skills management, records and content keeping, and delivery of e-Learning courses. Marc J. Rosenberg describes a detailed definition in prior art of the core capabilities of an LMS, in E-Learning: Strategies for Delivering Knowledge in the Digital Age, McGraw-Hill Books, 2001 pp162. First, by this definition, the LMS may have a common online course catalogue, a common online registration system and an up-front competency assessment tool. The LMS may have the ability to launch and track e-Learning and perform e-Learning assessments and perform management of learning materials. After integrating knowledge management resources the LMS may perform customized reporting, support collaboration and knowledge communities and integrate the information into the

respective system, e.g. a human resources system used in the management of an organisation.

In a conventional Learning Management System, the educational content is provided by a content developer and integrated into the LMS. For example, the information may be supplied by the content provider on one or more CD's or other media, and copied into the LMS system. A student interfaces with the LMS and the content is provided to the student by the LMS. This imposes limitations. The computing and network demands on the system will limit the number of users and the number of courses that can be accessed. There will also be problems if the content varies frequently, and this will be a particular problem if this type of system is used not only for education but also for accessing financial data or constantly changing databases of information.

Various learning systems are disclosed in United States Patents 5,727,950; 5,802,506; 6,029,156; 6,032,141; 6,067,537; 6,073,841; 6,116,652; 6,135,776; 6,141,529; 6,148,174; and 6,201,948.

United States Patent 6,149,441 shows a learning system in which users connect with a server via a school intranet or via the Internet. The server hosts a number of modules concerned with lesson management and content. All communications with a user are channeled through the server. United States Patent 6,190,178 discloses an Internet based learning management system. A user with a PC connects through the Internet to a server. The server includes a network connector, a controller, a remote education execution unit, a database management unit and a database. All communications with the user are directed through the controller and the server's network connector. The controller deals only with the local components in the server, namely the remote education execution unit, database management unit and database.

SUMMARY OF THE INVENTION

Viewed from one aspect, the present invention provides a system for providing a user with access to an information site hosting information with controlled access, in which there is provided a management site remote from the information site, the user logs on to the management site and the user is

authenticated by the management site, the user requests the management site for access to information which is hosted at the information site, the user is logged on to the information site with authenticated access to the information, and there is direct communication between the user and the information site, wherein there is also direct communication between the management site and the information site for exchange of management information.

In one preferred implementation of the invention, the management information comprises data relating to the user's activities on the information site. This is provided from the information site to the management site and stored on the management site for analysis. In another preferred implementation, the management information is user authentication data provided by the management site. Thus, the information site may carry out an authentication check using data provided by the management site to confirm that the user has been authenticated by the management site for access to the information.

Preferably, both of these functions are provided.

Thus, in accordance with the invention it is possible to have the advantages of an LMS, for example, in terms of management facilities and ease of use for a user, whilst having the ability to provide a greater volume of information, in terms of the sources of information, quantity of information and number of users. The user communicates directly with the information site to receive the information, and it does not have to be integrated into and hosted on the management site. It will be appreciated that when using the expression "direct communication" it is recognized that there may be many lines of communication, intermediate servers and so forth in the physical path of communication. The significance of the expression is that the information is hosted remotely and is not stored locally as part of the management site, and that management information is not channeled through the user.

In a practical implementation, a user at a PC will log on to the management site using the Internet or a corporate Intranet. After conventional authentication routines, such as entering a user name and password, the user selects a course to which he or she is permitted access. The user's browser is then directed to the information site, and if appropriate, basic authentication information such as the user name and password can be passed automatically

from the user to the information site. The information site will communicate with the management site to check that the user has been authorized by the management site to access the information, and when this is established the information such as a learning course will be presented in the conventional manner. However, the information can be presented on the user's screen within a standard format defined by the management site, so that the user has a standard interface regardless of the source of information. When the users logs out of the system, the information site provides management information to the management site. In the case of an educational course, this could be a progress report, time spent, standard reached and so forth. In the case of a technical database, the management information could include details of the number of documents requested and the fees payable. Preferably, the management site and information site use an identifier to denote a particular session, and not just a particular user, to monitor access to the information.

The protection sought is not limited to the system as a whole, whose components could be distributed over a number of countries, but to individual components.

Thus viewed from another aspect the present invention provides data processing means for use at a management site in the system described above, configured to provide a user with access to an information site hosting information with controlled access, the data processing means being arranged to authenticate a user, to receive a user request for access to information which is hosted at the information site, to arrange for the user to be logged on to the information site with authenticated access to the information by means of direct communication between the user and the information site, the data processing means also establishing direct communication between the management site and the information site for exchange of management information.

Viewed from another aspect, the present invention provides data processing means for use at an information site in the system described above, configured to receive a request from a user for access to information, to communicate directly with the user for supply of the information, and to communicate directly with the management site for exchange of management information.

Viewed from another aspect the present invention provides computer software which when run on data processing means will configure the data processing means for use in a management site or information site as set out above. the software may be provided on physical media such as a CD-ROM or
5 tape, or as signals from a remote site sent over e.g. a network such as the Internet, or by means of terrestrial or satellite broadcasting, for example.

In the following discussion of preferred features of the system, a system in accordance with the invention will be referred to as an "Open Learning Management System" or "OLMS".

10 In a preferred implementation of the invention, a single source system (SSS) operates as a hosted solution through a portal on a digital distributor such as the Internet and seamlessly integrates content from different sources, using technology and services in an open learning management system (OLMS). The OLMS implements the material into a form suitable for a student, in the case that
15 the content is e-Learning. Using a course tracking system, the OLMS logs all the activities performed with the content and the resources by the users of the system and stores the activity information for future use. Use may be by company human resources (HR) systems/organizations where the students are employed, or other customers. A log of activity generated by the students of the SSS is
20 provided, either as data exchange, or as an integrated part of the external receivers of resources and systems. A major advantage of the system is that the students do not need logins at the external content developers, specialist technology in the form of hardware/software, or retrieval of any specialist services, but obtain all elements needed for e-Learning at one point.

25 The OLMS preferably has all the capabilities of a state of art LMS. In addition, the functionality of the OLMS is integrated in a portal solution, and is open in a way that any content can be integrated, and data exported to any HR systems. A prior art traditional LMS including content managed by the LMS is located at a specific computer such as a server, e.g. in a specific database, and
30 the content needs continuous updating. As opposed to this, an important advantage of the OLMS is that the system manages content that may be located at other computers, databases or on the servers of external content developers. Consequently, a server comprising the OLMS of the present system has a "peer

to peer" communication directly with the servers of the external content developers. This gives two important advantages for the user of the system, namely it provides flexibility to be able to compose the learning program freely according to needs, and the students do not need logins at the sites of the content developers.

The content developers, i.e. the agents/vendors developing content may be of various types. There are various schools, universities, companies that develop content for digital distribution, and also organizations that develops company/organisation specific or general content. A typical course comprises a sharable, educational object consisting of one or more "Assignable Units" (AU's) which are the smallest units of information that the system assigns and tracks. An AU is part of a course or an education program that gives the learner understanding of a specific subject. As opposed to e.g. typical university courses, that often have a fixed pattern of functionalities and facilities, courses built of AU's may be flexible and changeable to be adapted to the users need. Content may also be divided into content objects which are self - contained or self - instructive units of content, such as a chapter of a course on a specific subject.

The course is preferably described by a specific standard. For example, a course may be exemplified by, but not limited to, the SCORM (Sharable Content Object Reference Model) standard. SCORM (TM) is a reference model that defines a Web-based learning "content model" and is a set of interrelated technical specifications, that designed to meet e.g. the demands of authorities for a high level reliable and robust standard. SCORM is a standard to generate an evolving document to collect all the "bits and pieces" in one place.

The content may be any information provided by external vendors for the OLMS to provide to the users of the single source system. This may include e-Learning /Educational resources such as courses, presentations, activities, assessments, tutors etc. The content could be any combination of text, graphics, video and audio. The content could be a combination of synchronic (live or not) or asynchronic education. Synchronic learning is learning that is dependent on time. Users can only access content at scheduled sessions. The synchronic learning content could be pictures and audio of a teacher, either live or recorded and played back at a specified time. By contrast, a-synchronic learning is

learning that is independent on time, that makes it possible for the user to receive any part of the education at any time.

The content could be an MBA program or a language course, for example. It may be divided into categories such as general education, working skills, and personal development. An MBA program is an example of general education. Working skills content is related to the learner's working situation. Content for personal development could be time management and language skills. The expression "soft skills" can be applied to non-technology-related, people-oriented skills such as leadership, marketing, and human relations. A complete, shareable learning program could be composed of a combination of various content, with the purpose of providing knowledge, training or education to a user within a specified field.

Implementation of a system will involve the stepwise process of choosing content, building solutions (such as portals and communities), implementing follow-up systems and design, and support implementation programs. A portal is a doorway or gateway to content on a computer network. The portal can serve as a single location where the users access content. An e-Learning portal can be educational content consolidated into one web site that is accessible to the users.

A user is a verified and identified person or program accessing the system. The user is given access to content based on access rights given by system administrators. The users could be organizations, groups of persons or single persons. Students, administrators and HR systems are examples of users. A student is a single human user of the content. An administrator is a company, organisation or person who administers the OLMS and arranges for the single source solution to be provided to users.

The preferred system meets the need of seamless integration of content from external content developers, providing flexible availability of the content to users in a single system, making it possible for the users to compose their own learning programs.

BRIEF DESCRIPTION OF THE DRAWINGS

Some preferred embodiments of systems in accordance with the invention will now be described by way of example and with reference to the accompanying drawings, in which:

Figure 1 is a diagram showing the organisation of a prior art traditional Learning Management System;

Figure 2 is a diagram of one embodiment of a system in accordance with the invention;

Figure 3 diagram showing the organisation of a prior art traditional Learning Management System showing how multiple users are handled;

Figure 4 is a diagram of one embodiment of a system in accordance with the invention, showing how multiple users are handled;

Figure 5 is another overview of a system in accordance with the system;

Figure 6 is a more detailed schematic overview of part of a system in accordance with the invention;

Figure 7 is a screen shot of a user logon screen in a system in accordance with the invention;

Figure 8 is a screen shot of a typical list of courses available in a system in accordance with the invention;

Figure 9 is a screen shot of information about a typical course in a system in accordance with the invention;

Figure 10 is a screen shot of information about user activity on a course in a system in accordance with the invention;

Figure 11 is a screen shot of a change password screen in a system in accordance with the invention;

Figure 12 is a screen shot of a user profile update screen in a system in accordance with the invention;

Figure 13 is a diagram showing what happens when a user wants to access a course in a system in accordance with the invention; and

Figure 14 is a diagram showing what happens when a user logs out from a course in a system in accordance with the invention.

The following description contains computer code which is subject to copyright protection and the Figures show text and screen layouts which are also

subject to copyright protection. Attention is drawn to the copyright notice at the commencement of this specification.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

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Figure 1 shows a conventional LMS system. As shown at 1, a content developer delivers content that is integrated into the LMS. At 2, a student accesses the content by entering the LMS system. At 3, use of the system and content by the student is tracked by the LMS. At 4, information about user activities is accessed from the LMS by the student and other users such as administrators.

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Figure 2 shows how the OLMS in accordance with the present invention is configured. At 1, a content developer produces external content, and in this case it is integrated into an LMS such as an on-line university education system. At 2, a student accesses the OLMS and requests access to content. At 3 the OLMS provides instructions for communicating with the external content. At 4, the student accesses the external content system directly, and at 5 the OLMS deals directly with the external system to authorize the student. The student then accesses the external content directly, at 6. At 7, the external system reports to OLMS, and at 8 information is made available from OLMS to the student and other users.

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Figure 3 illustrates a prior art method of including other students. The content developer provides content which a student accesses in an LMS. The students are isolated within the organisation / LMS system. The content developers produce a single copy of the content for each LMS and the student accesses this copy, not a learning environment of the content developer. The information is limited to the LMS. In Figure 4, by contrast, The content provider provides content to an LMS, as in Figure 2. By means of the OLMS at a particular organisation, a student can access this content as can other students at the same organisation. External students, not connected with the organisation, can connect to the LMS in the normal manner. Students from different companies or organizations, or private individuals, can be connected in a

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common virtual learning environment. Information to a student includes results from the total learning environment within the external content developer.

Figure 5 is an overview of a system in accordance with the invention, in which the OLMS may contain integrated content from content developers, as well as the external content which students will be connected to directly. The student accesses all content from a single source, and the content is not limited to specific standards or formats. The student may obtain information from both the OLMS and the external content providers,. Other users could be not only companies, organizations or individuals, but also systems such as a human resources system.

As shown in Figure 6, At the heart of the Open LMS is the Core API (Application Programmer's Interface). This API provides access to the core business logic with generic functionality for storing, retrieving and manipulating content information and data related to user activities. Content objects are integrated with the OLMS by adding a thin layer of protocol adapters on top of the Open LMS Core API, illustrated as Protocol Adapters 1 to n which are associated with content from vendors A to X. The adapters are responsible for launching the content objects and for exchanging user activity information with them. This means that there is no need to change the complex business logic of the core API to integrate a new type of content object. It also means that the OLMS can support the different e-Learning standards as well as the proprietary formats often used in more complex academic courses and such like. The adapters map the request formats used by the different content objects to the formats used in the core API to exchange user activity information. All information about the content objects themselves and their related user activities, is stored in a uniform way regardless of the original format. Other systems using the services provided by the OLMS may then completely disregard the different technical implementations of the content objects.

As noted earlier, the adapters are responsible for launching the content objects. The content objects themselves may be hosted externally on another server than the OLMS. To access these externally hosted content objects, the OLMS also handles authentication of the individual user on the external server. This is accomplished by appropriating information stored in the OLMS to the

formats and methods used by the remote content server for launching the course. In other words, the user needs only interact consciously with one system regardless of where the content objects are actually located and what technology they are based on.

5 A significant advantage for the student is that due to the openness in the system, he/she has one access point to all e-Learning content, access to external content without anew log in, and being a part of an extended (more than company's or a particular provider's) e-Learning network. The user's experience of the content is the same whether it is integrated and hosted by OLMS or
10 external content hosted by external content provider. The student accesses one course catalogue where all the content is presented the same way. Thus, the following are presented and work in the same way:

Information

15 Accessing of content

Information of status/score etc

Other functionality

20 Information like course, functionality and vendor descriptions are presented identically throughout the portal. The course structure (course ID, topic areas) are built and presented the same way independent of vendor. The student uses the same functionality to access "free" content, getting information of applying for restricted content regardless of vendor or signing up for use of other resources like virtual classroom sessions. Available information is
25 presented the same way to the student even if the courses are hosted externally.

As shown in the screen shot of Figure 7, a user logs into an OLMS (in this case "eLearning.EdVantage") in accordance with the invention by giving a user name and password. Figure 8 shows how a user can have access to a range of courses, provided by different sources. Figure 9 shows how the OLMS, using
30 the same interface, enables a student to have access to a course - in this case a course on "Advanced Presentation Skills" provided SkillSoft (TM). From the same screen, the user can search for additional resources e.g. by looking for books through "Amazon.co.uk" (TM). As shown in Figure 10, a student may

access information on course progress, scores etc. provided by the external course provider, still using the same interface.

Additional functionality is also consistent throughout the portal. This includes updating a user's password or profile as shown in Figures 11 and 12.

5 This may include customization of language and time zone. It is easy for a student to create a personalized curriculum or course list by adding and removing courses to "My Courses" using simple icons. The system may also print a diploma for completed courses.

10 A particular advantage to other users/administrator is the openness in the OLMS which make it possible to use information as input in any existing HR system. This means one report can be provided with statistics/metrics etc. including all different vendors/systems. It also provides a consistent way to:

15 Add and remove users
Add and remove content
Obtain statistics of system access, course started, course completed etc.
Set restrictions
Give access to restricted content
Schedule "meetings" in a virtual classroom
20 Access other resources

Some content may be restricted and require specific attention. This could be caused by high cost of a particular course, or a course with a fixed starting date. In this case a student would get an application form or instructions from the
25 system.

Collaboration tools are provided, for example to provide a virtual classroom and similar. Users can be given on-line lecturers and presentations, and can give input/feedback.

Figure 13 is a diagram showing the steps taken when user connects to the
30 OLMS ("Edvantage") and requests access to a course. In this example it is a course provided by an external vendor "Academee" (TM). The user requests logon to Academee. A request is made to Academee with the following parameters:

The Academee email address for the user requesting the course -
acdmEmail

5 The Academee ID of the requested course
edgHost - acdmCourseID

The Edvantage host name exclusive domain - edgHost

10 The current session ID at Edvantage - edgSession

The user's ID in Edvantage - edgUserID

The Edvantage ID for the course - edgCourseID

15 The request is processed and there is an authentication callback to
Edvantage with the following parameters:

Current Session ID

20 Edvantage User ID

Edvantage Course ID

The callback to Edvantage is sent as a "GET" to the host:

25 http://<host>.edvantage.net/servlet/SessionValidatorServlet?edgSession=<edgSe
ssion>&edgUserID=<edgUserID>
&edgCourseID=<edgCourseID>

If the session ID is validated and authentication is successful, a response is made
30 to Academee and the user will be logged on to the course.

When a user logs out from the course, the procedure is as shown in
Figure 14. A request is made to Edvantage with the following parameters:

Servername (exclusive domain)

Academee session ID

Academee email address

Course data

5 Edvantage user ID

Edvantage course ID

The Course Data could be as follows:

10 edgUserID - the user's ID in Edvantage

edgCourseID - Edvantage's ID for the course

acdmSession - current Academee session ID

acdmCourseID - Academee course ID

acdmEmail - Academee email address

15 firstAccess - date of first access ('yyyy-mm-dd hh:mm:ss')

lastAccess - date of last access ('yyyy-mm-dd hh:mm:ss')

visits - the number of visits

activitiesCompleted - the number of completed activities

activitiesRemaining - the number of remaining activities

20 sectionsCompleted - the number of sections completed

expectedCompletionDate - the expected completion date ('yyyy-mm-dd hh:mm:ss')

percentageCompleted - the percentage completed

25 The request is processed and there is an authentication callback, i.e. a request to Academee with parameters Academee session ID and Academee e-mail address. The session ID is validated and there is a response to Edvantage if authentication is successful. If the status is OK, then the results are stored.

30 Java code for carrying out operations could be as follows. This is by way of example for information purposes only and copyright is reserved except to the extent that it is necessary to reproduce the code for an understanding of the disclosure.

```

import
javax.servlet.http.*;java.sql.*;java.io.IOException;javax.servlet.ServletException
n;net.edvantage.util.*;net.edvantage.cts.db.*;net.edvantage.cts.adapter.*;java.util
.*;java.net.*;/** @author zzz, zzz@edvantagegroup.com* @version $Id:
5   CTSAcademeeServlet.java,v 1.5 2001/07/18 17:08:47 zzz Exp $*/class
CTSAcademeeServlet extends HttpServlet { public void doGet
(HttpServletRequest req, HttpServletResponse res) throws ServletException,
IOException {           // Get all relevant parameters
String strEDGUserId = req.getParameter("edgUserID");
10  String strEDGCourseId = req.getParameter("edgCourseID");
String strACDMSession = req.getParameter("acdmSession");
String strACDMCourseId = req.getParameter("acdmCourseID");
String strACDMEmail = req.getParameter("acdmEmail");
String strFirstAccess = req.getParameter("firstAccess");
15  String strLastAccess = req.getParameter("lastAccess");
String strVisits = req.getParameter("visits");
String strActivitiesCompleted = req.getParameter("activitiesCompleted");
String strActivitiesRemaining = req.getParameter("activitiesRemaining");
String strSectionsCompleted = req.getParameter("sectionsCompleted");
20  String strExpectedCompletionDate =
req.getParameter("expectedCompletionDate");
String strPercentageCompleted = req.getParameter("percentageCompleted");
String strAcademeeHost = req.getParameter("acdmHost");

25  //System.out.println("The following lines are printed from CTSAcademeeServlet
doGet:");
        //System.out.println("edgUserID=" + strEDGUserId);
        //System.out.println("edgCourseID=" + strEDGCourseId);
        //System.out.println("acdmSession=" + strACDMSession);
30  //System.out.println("acdmCourseID=" + strACDMCourseId);
        //System.out.println("acdmEmail=" + strACDMEmail);
        //System.out.println("firstAccess=" + strFirstAccess);
        //System.out.println("lastAccess=" + strLastAccess);

```



```

        //System.out.println("visits=" + strVisits);
        //System.out.println("activitiesCompleted=" + strActivitiesCompleted);
        //System.out.println("activitiesRemaining=" + strActivitiesRemaining);
        //System.out.println("sectionsCompleted=" + strSectionsCompleted);
5        //System.out.println("expectedCompletionDate=" +
strExpectedCompletionDate);
        //System.out.println("percentageCompleted=" +
strPercentageCompleted);
        //System.out.println("acdmHost=" + strAcademeeHost);        //
10    Check if all parameters needed for handshake with Academee is present. If not
send error
        if (strAcademeeHost == null) {
            res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: acdmHost");        }
15        else if (strACDMSession == null) {
            res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: acdmSession");        }
        else if (strACDMCourseId == null) {
            res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
20    field: acdmCourseID");        }
        else if (strACDMEmail == null) {
            res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: acdmEmail");        }
        else {
25
            String strQuery = "acdmSession=" +
URLLEncoder.encode(strACDMSession) + "&acdmEmail=" +
URLLEncoder.encode(strACDMEmail)
                + "&acdmCourseID=" +
30    URLLEncoder.encode(strACDMCourseId);
            Hashtable hshValidation = SessionValidator.validate("http://www." +
strAcademeeHost + ".com/edvantage/reportValidate.asp?" + strQuery);

```

```

        int intResponseCode = Integer.parseInt((String)
hshValidation.get("status"));
        if (intResponseCode != HttpServletResponse.SC_OK) {
            res.sendError(intResponseCode);
        }
5        else if (strEDGUserId == null) {
            res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: edgUserID");
        }
        else if (strEDGCourseId == null) {
            res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
10 field: edgCourseID");
        }
        else if (strFirstAccess == null) {
            res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: firstAccess");
        }
        else if (strLastAccess == null) {
15 res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: lastAccess");
        }
        else if (strVisits == null) {
            res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: visits");
        }
20        else if (strActivitiesCompleted == null) {
            res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: activitiesCompleted");
        }
        else if (strActivitiesRemaining == null) {
            res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
25 field: activitiesRemaining");
        }
        else if (strSectionsCompleted == null) {
            res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: sectionsCompleted");
        }
        else if (strExpectedCompletionDate == null) {
30 res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: expectedCompletionDate");
        }

```

```

        else if (strPercentageCompleted == null) {
            res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: percentageCompleted");
        }
        else { //System.out.println("CTSAcademeeServlet (Stores data on our
5 side): OKEY DOKEY: correct data received");
            }
        } //end doGet /** * Documentation
not specified in this example
        */
        public void doPost (HttpServletRequest req, HttpServletResponse
res) throws ServletException, IOException {
10        net.edvantage.util.Authenticator.authenticate(req, res);
            HttpSession session = req.getSession(false);
            Connection con = null;
            // Get all relevant parameters
            String strEDGUserId = req.getParameter("edgUserID");
            String strEDGCourseId = req.getParameter("edgCourseID");
15            String strACDMSession = req.getParameter("acdmSession");
            String strACDMCourseId = req.getParameter("acdmCourseID");
            String strACDMEmail = req.getParameter("acdmEmail");
            String strFirstAccess = req.getParameter("firstAccess");
            String strLastAccess = req.getParameter("lastAccess");
20            String strVisits = req.getParameter("visits");
            // Changed variable & parameter name to "activitiesComplete"
            String strActivitiesComplete = req.getParameter("activitiesComplete");
            String strActivitiesRemaining =
25            req.getParameter("activitiesRemaining");
            // Changed variable & parameter name to "sectionsComplete"
            String strSectionsComplete = req.getParameter("sectionsComplete");
            String strExpectedCompletionDate =
            req.getParameter("expectedCompletionDate");
30            // Changed variable & parameter name to "percentageComplete"
            String strPercentageComplete =
            req.getParameter("percentageComplete");
            String strAcademeeHost = req.getParameter("acdmHost");

```

```

        //System.out.println("The following lines are printed from
CTSAcademeeServlet doPost:");

        //System.out.println("edgUserID=" +
strEDGUserId);//System.out.println("edgCourseID=" + strEDGCourseId);
5        //System.out.println("acdmSession=" + strACDMSession);
        //System.out.println("acdmCourseID=" + strACDMCourseId);
        //System.out.println("acdmEmail=" + strACDMEmail);
        //System.out.println("firstAccess=" + strFirstAccess);
        //System.out.println("lastAccess=" + strLastAccess);
10        //System.out.println("visits=" + strVisits);
        //System.out.println("activitiesComplete=" + strActivitiesComplete);
        //System.out.println("activitiesRemaining=" + strActivitiesRemaining);
        //System.out.println("sectionsComplete=" + strSectionsComplete);
        //System.out.println("expectedCompletionDate=" +
15 strExpectedCompletionDate);
        //System.out.println("percentageComplete=" + strPercentageComplete);
        //System.out.println("acdmHost=" + strAcademeeHost);
        ///Enumeration enu = req.getParameterNames();
        ///while (enu.hasMoreElements()) {
20        System.out.println("Parameternames: " + (String) enu.nextElement());
        //}
        // Check if all parameters needed for handshake with Academee is
present. If not send error
        if (strAcademeeHost == null) {
25        res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: acdmHost");
        }
        else if (strACDMSession == null) {
        res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: acdmSession");
        }
30        else if (strACDMCourseId == null) {
        res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: acdmCourseID");
        }

```

```

        else if (strACDMEmail == null) {
            res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: acdmEmail");
        }
        else {
            String strQuery = "acdmSession=" +
5      URLEncoder.encode(strACDMSession) + "&acdmEmail=" +
            URLEncoder.encode(strACDMEmail) + "&acdmCourseID=" +
            URLEncoder.encode(strACDMCourseId);

            Hashtable hshValidation = SessionValidator.validate("http://www." +
strAcademeeHost + ".com/edvantage/reportValidate.asp?" + strQuery);
10      int intResponseCode = Integer.parseInt((String)
hshValidation.get("status"));

            //System.out.println("The response code upon session validation is: " +
intResponseCode);

            //System.out.println("SC.OK: " + HttpServletResponse.SC_OK);
15      if (intResponseCode != HttpServletResponse.SC_OK) {
                // Write meaningful error text to the system log saying that the session at
Academee could not be validated.

                res.sendError(intResponseCode);
            }
            else if (strEDGUserId == null) {
20      res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: edgUserID");
            }
            else if (strEDGCourseId == null) {
                res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: edgCourseID");
            }
25      else if (strFirstAccess == null) {
                res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: firstAccess");
            }
            else if (strLastAccess == null) {
                res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
30      field: lastAccess");
            }
            else if (strVisits == null) {
                res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: visits");
            }
        }
    }
}

```

```

        else if (strActivitiesComplete == null) {
            res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: activitiesComplete");
        }
        else if (strActivitiesRemaining == null) {
5         res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: activitiesRemaining");
        }
        else if (strSectionsComplete == null) {
            res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: sectionsComplete");
        }
10         else if (strExpectedCompletionDate == null) {
            res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
field: expectedCompletionDate");
        }
        else if (strPercentageComplete == null) {
            res.sendError(HttpServletResponse.SC_BAD_REQUEST, "Missing
15 field: percentageComplete");
        }
        else { //System.out.println("CTSAcademeeServlet (Stores data on our
side): OKEY DOKEY: correct data received");
            try {con = MultiDbBroker.getConnection(req.getServerName());

20             // Store the data, using AcademeeAdapter
            AcademeeAdapter.putParam(strEDGUserId, strEDGCourseId,
strACDMSession, strACDMCourseId, strACDMEmail, strFirstAccess,
strLastAccess, strVisits, strActivitiesComplete, strActivitiesRemaining,
strSectionsComplete, strExpectedCompletionDate, strPercentageComplete,
25 strAcademeeHost, con);
            }
            catch (EdvantageException e) {if (con != null) {
                MultiDbBroker.freeConnection(req.getServerName(), con);
            }
            session.setAttribute("EDGexception",e);
30         res.sendRedirect("/std/messages/Error.jsp");
            }
            catch (Exception e){if (con != null) {
                MultiDbBroker.freeConnection(req.getServerName(), con);
            }
        }
    }
}

```

```

EdvantageException edx = new EdvantageException("errorError", e,
EdvantageException.LEVEL_FAILURE);
        session.setAttribute("EDGexception",edx);
        res.sendRedirect("/std/messages/Error.jsp");
5        } finally {if (con != null) {
        MultiDbBroker.freeConnection(req.getServerName(), con);
                }
        }
        }
        } //end doPost} //end class

```

10

The system described above is a single source educational system providing e-Learning. It is operated over a hosted solution in a computer network such as the Internet. The educational system provides individual or corporate e-Learning in a computerized or digital form and provides educational content in a standardized form, technology in the form of hard skills and soft skills for the system to be functional and services for the user of the system. One advantage of the system is that it is unnecessary for the user to log into other sources than the portal including the OLMS to receive the complete e-Learning. The present invention may comprise standard learning objects as described above. An important purpose of using standard learning objects, for example AU's (Assignable Units) as defined above as a tool, is for the system user to adapt his learning program as flexibly as possible. The AU's may be originated at a first server used by the developers of technology or content, or may be provided by the OLMS system on the server providing the e-Learning to the user of the system. In this way, a specific curriculum or learning program may be adapted and offered to the specific user.

Another advantage of the system is that the content developer may generate reporting, not only between the user and an external system, but also between the external systems, in a way that is not visible to the user of the system. Thus, the user is not distracted. The system is such that as viewed from the user, the system is a single source of content and/or resources from different sources standards as well as proprietary, 100% hosted environment. Thus, the customer does not need to invest in hardware, software or any kind of technology

platform. Yet another advantage of the system is that there are significant commercial benefits related to selling and providing the service with monthly or quarterly fees based on level of content and resources and number of users. This give a low risk for a user of the system arranging e-Learning to a group of
5 individual users, because of the low need to invest in different systems to provide the e-Learning. Other advantages provided by the system are uniform description and access to content, uniform reporting to both user and other systems such as HR systems, and single sign-on and identification. The user "goes to" the learning directly, and not the other way around.

10 It will be appreciated that there will be many variations and modifications to the preferred embodiments as described above, which are for illustrative purposes only. The scope of the invention is defined by the appended claims.